WHAT IS CLAIMED IS:

1. An optical fiber comprising:

an optical fiber which has a taper form shaped elliptical in the cross section of one end face of a core and cladding and changed gradually to be circular as separating away from the end face;

a holding member which holds the optical fiber in the predetermined length from the end face or the whole body from the side of the optical fiber, and has a coefficient of thermal expansion approximately equal to the value of a coefficient of thermal expansion of the cladding material of the optical fiber; and

a sealing material which fills a gap between the optical fiber and the holding member.

2. A optical fiber module according to claim 1, wherein at least one of the end faces of the optical fiber is polished together with the holding member.

3. A optical fiber module according to claim 1, wherein the holding member is glass or ceramic material.

4. A optical fiber module according to any one of claim 1 to 3, wherein the sealing material is glass having a fusing point sufficiently lower than a glass transition temperature of a core material and a glass transition temperature of a cladding material of the optical fiber.

5. A method of manufacturing an optical fiber

module comprising:

a first step of placing an optical fiber between substrates having a coefficient of thermal expansion approximately equal to a coefficient of thermal expansion of a cladding material of the optical fiber;

a second step of heating the substrates and the optical fiber placed between the substrates to a temperature higher than a glass transition temperature of a core material and a glass transition temperature of a cladding material of the optical fiber;

a third step of applying a predetermined pressure in the direction almost vertical to the bonded surface of the glass substrates while maintaining the temperature;

a fourth step of filling adhesive material in a gap between the optical fiber and the holding member, and bonding them; and

a fifth step of polishing the end face of the optical fiber together with the substrates holding the optical fiber.

6. A method of manufacturing an optical fiber module comprising:

a first step comprising a step of placing an optical fiber between substrates having a coefficient of thermal expansion approximately equal to a coefficient of thermal expansion of a cladding material of the optical fiber, and a step of inserting a spacer

member having a predetermined thickness in at least one location between the substrates;

a second step of heating the substrates, the optical fiber placed between the substrates, and the spacer member to a temperature higher than a glass transition temperature of a core material and a glass transition temperature of a cladding material of the optical fiber;

a third step of applying a predetermined pressure in the direction almost vertical to the bonded surface of the glass substrates while maintaining the temperature;

a fourth step of filling adhesive material in a gap between the optical fiber and the holding member, and bonding them; and

a fifth step of polishing the end face of the optical fiber together with the substrates holding the optical fiber.

7. A method of manufacturing an optical fiber module comprising:

a first step comprising a step of inserting an optical fiber between substrates having a coefficient of thermal expansion approximately equal to a coefficient of thermal expansion of a cladding material of the optical fiber, and a step of inserting between the substrates a predetermined amount of a low fusing point glass material having a fusing point sufficiently

lower than a glass transition temperature of a core material and a glass transition temperature of a cladding material of the optical fiber;

a second step of heating the substrates, the optical fiber inserted between the substrates, and the low fusing point glass material to a temperature higher than a glass transition temperature of a core material and a glass transition temperature of a cladding material of the optical fiber;

a third step of applying a predetermined pressure in the direction almost vertical to the bonded surface of the glass substrates while maintaining the temperature; and

a fourth step of polishing the end face of the optical fiber together with the substrates holding the optical fiber.

8. A method of manufacturing an optical fiber module comprising:

a first step comprising a step of inserting an optical fiber between substrates having a coefficient of thermal expansion approximately equal to a coefficient of thermal expansion of a cladding material of the optical fiber, a step of inserting a spacer member having a predetermined thickness in at least one location between the substrates, and a step of inserting between the substrates a predetermined amount of a low fusing point glass material having a fusing

point sufficiently lower than a glass transition temperature of a core material and a glass transition temperature of a cladding material of the optical fiber;

a second step of heating the substrates, the optical fiber placed between the substrates, the spacer member, and the low fusing point glass material to a temperature higher than a glass transition temperature of a core material and a glass transition temperature of a cladding material of the optical fiber;

a third step of applying a predetermined pressure in the direction almost vertical to the bonded surface of the glass substrates while maintaining the temperature; and

a fourth step of polishing the end face of the optical fiber together with the substrates holding the optical fiber.

9. An image display unit comprising:

fiber laser apparatuses which output R, G and B lights;

spatial modulation elements which spatially modulate the R, G and B lights;

a synthesizing means which synthesizes the R, G and B lights spatially modulated by the spatial modulation elements; and

an optical element which forms the image of the output light of the synthesizing means at

a predetermined position;

wherein at least one of the fiber laser apparatuses has an optical fiber module manufactured by the method of claim 5, between a semiconductor laser and an up-conversion fiber.

10. An image display unit comprising:

fiber laser apparatuses which output R, G and B lights;

a white light synthesizing means which collects the R, G and B lights as one light and makes it a white light when viewed macroscopically;

a spatial modulation element which spatially modulates the output light of the white light synthesizing means; and

an optical element which forms the image of the light modulated spatially by the spatial modulation element at a predetermined position;

wherein at least on of the fiber laser apparatus has an optical fiber module manufactured by the method of claim 5, between a semiconductor laser and an up-conversion fiber.

11. An image display unit comprising:

fiber laser apparatuses which output R, G and B lights;

spatial modulation elements which spatially modulate the R, G and B lights;

a synthesizing means which synthesizes the R, G

and B lights spatially modulated by the spatial modulation elements; and

an optical element which forms the image of the output light of the synthesizing means at a predetermined position;

wherein at least one of the fiber laser apparatuses has an optical fiber module manufactured by the method of claim 6, between a semiconductor laser and an up-conversion fiber.

12. An image display unit comprising:

fiber laser apparatuses which output R, G and B lights;

a white light synthesizing means which collects the R, G and B lights as one light and makes it a white light when viewed macroscopically;

a spatial modulation element which spatially modulates the output light of the white light synthesizing means; and

an optical element which forms the image of the light modulated spatially by the spatial modulation element at a predetermined position;

wherein at least one of the fiber laser apparatus has an optical fiber module manufactured by the method of claim 6, between a semiconductor laser and an up-conversion fiber.

13. An image display unit comprising:

fiber laser apparatuses which output R, G and B

lights;

spatial modulation elements which spatially modulate the R, G and B lights;

a synthesizing means which synthesizes the R, G and B lights spatially modulated by the spatial modulation elements; and

an optical element which forms the image of the output light of the synthesizing means at a predetermined position;

wherein at least one of the fiber laser apparatus has an optical fiber module manufactured by the method of claim 7, between a semiconductor laser and an up-conversion fiber.

14. An image display unit comprising:

fiber laser apparatuses which output R, G and B lights;

a white light synthesizing means which collects the R, G and B lights as one light and makes it a white light when viewed macroscopically;

a spatial modulation element which spatially modulates the output light of the white light synthesizing means; and

an optical element which forms the image of the light modulated spatially by the spatial modulation element at a predetermined position;

wherein at least one of the fiber laser apparatuses has an optical fiber module manufactured by

the method of claim 7, between a semiconductor laser and an up-conversion fiber.

15. An image display unit comprising:

fiber laser apparatuses which output R, G and B lights;

spatial modulation elements which spatially modulate the R, G and B lights;

a synthesizing means which synthesizes the R, G and B lights spatially modulated by the spatial modulation elements; and

an optical element which forms the image of the output light of the synthesizing means at a predetermined position,

wherein at least one of the fiber laser apparatuses has an optical fiber module manufactured by the method of claim 8, between a semiconductor laser and an up-conversion fiber.

16. An image display unit comprising:

fiber laser apparatuses which output R, G and B lights;

a white light synthesizing means which collects the R, G and B lights as one light and makes it a white light when viewed macroscopically;

a spatial modulation element which spatially modulates the output light of the white light synthesizing means; and

an optical element which forms the image of

the light modulated spatially by the spatial modulation element at a predetermined position;

wherein at least one of the fiber laser apparatuses has an optical fiber module manufactured by the method of claim 8, between a semiconductor laser and an up-conversion fiber.